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Laboratory Diagnosis Of Bovine Leptospirosis

Burman L. Wright*

IN ISSUE No. 2 1951 the *Iowa State College Veterinarian* published an article by Dr. K. R. Reinhard entitled Bovine Leptospirosis. Since that time, the Iowa Veterinary Diagnostic Laboratory has received several cases which were diagnosed as leptospirosis. Following is the history and laboratory finding of three herds:

Case 1

August 29, 1951—A six-weeks-old calf was submitted with the following history: The calf was noticed to be sick and off feed. A local veterinarian was called. Examination of the calf revealed: anemic mucous membranes, hemoglobinuria, rapid respiration, and temperature of 103.8°F. Calf was treated with penicillin but died the following day. This calf's dam was not normal at the time of calf's illness. Another calf died several days previously and early this spring one of the cows on this farm was sick and showing hemoglobinuria.

Necropsy of the calf presented to the Iowa Veterinary Diagnostic Laboratory revealed the following: hemoglobinuria, icteric liver, ecchymotic hemorrhages in the cortex of kidney. A dark field examination of renal medullary scrapings was made and *Leptospira* organisms identified. Worthin silver stained sections of liver and kidney were positive for *Leptospira*. Most of the *Leptospira* were in the uriniferous tubules or in the epithelium lining the uriniferous tubules.

* Mr. Wright is a member of the present senior class.

Case 2

September 13, 1951—Urine and kidney specimens from a 500 pound feeder calf were brought to the laboratory. This calf showed hemoglobinuria at the time of death. Another calf in the herd died earlier showing this same symptom. Dark-field examination of the urine revealed suspected *Leptospira*.

An adult guinea pig was inoculated with a suspension of kidney tissue. At the time of inoculation (Sept. 13) the guinea pig's temperature was 101.5°F. By Sept. 20, the temperature had risen to 104°F. The next day three ccs. of blood were drawn aseptically and subjected to a dark-field examination which was negative. One cc. of this blood was injected intraperitoneally into a second guinea pig. Temperature rose to 104°F. in six days. Autopsy on Oct. 3 revealed viscera to be normal with exception of shrunken areas in lungs resembling scar tissue and the kidneys were dense, pale, and shrunken. Dark-field examination of renal fluid revealed many *Leptospira*. Kidney emulsions were injected into mice and hamsters. Two mice were given two ccs. intraperitoneally. They were destroyed two weeks later and no visible lesions observed. Blood was drawn and serum saved. The young hamster died three days following inoculation and the older one in 11 days. Post mortem findings were central lobular liver necrosis and hemoglobinuria. Specimens were refrigerated before dark-field examination, which was negative for *Leptospira*.

On Sept. 28, one sick and one dead

calf from this same herd were brought to the laboratory. The history of this herd is as follows: 179 head were purchased in July. This herd originated in the South. Fourteen calves died and 12 were sick. Animals were weak, depressed, but retained appetite. Two-thirds of the dead calves showed hemoglobinuria, anemia, icterus, and mild fever. Seven recovered after being treated with penicillin. These two calves were treated with penicillin and showed some improvement but then their condition became worse. The sick calf was slightly anemic. The hair in the region of the prepuce was tinged with hemoglobin but urine was of normal color.

Post mortem examination revealed a mild catarrhal enteritis, lungs were approximately normal, and there was some gross evidence of tubular degeneration in kidneys. Dark-field examination revealed one live *Leptospira* in the urine.

The calf that was dead upon arrival at the laboratory was emaciated, dehydrated, urine was normal appearing, and there were hemoglobin tinged hairs near the prepuce. The kidneys were shrunken and sclerotic. The mucous membrane of the small intestine had many small areas, to one cm. in diameter, which were darkly pigmented and appeared to be blood pigments from previous hemorrhages. Cultures revealed no significant bacterial agents. Tissues were sectioned for silver staining and further study.

Case 3

September 4, 1951—A calf, specimens from one dead and one sick cow were brought to the diagnostic laboratory. The history was that on Aug. 29 a veterinarian was called to his farm as cows were off feed and production. Two cows were treated with sodium cacodolate and penicillin. The next day the animals were noted to be anemic. By this time, a third cow was sick and all three showed hemoglobinuria. The two treated animals died, but the untreated one made a slow recovery and in two weeks was up to one-half of normal production. These cows were heavy milkers.

The local creamery had protested about milk from this farm. The milk was yellow

and thickened. However, there were no mammary lesions.

Post mortem findings: evidence of a fiery red hemoglobinuria, and marked cortical ecchymotic hemorrhages on the kidneys. Suspicious forms resembling dead *Leptospira* were found on dark-field examination of the urine. Blood was negative for *Leptospira*. There were no significant bacterial findings.

Further work and study is being made on the various cultures so as to establish the species classification of these *Leptospira* organisms.

Serum samples from 25 cows in a Med-west herd suffering losses of calves were tested for antibody titer against *Leptospira*. Symptoms of bloody urine predominated. Ten of these samples gave positive results indicating that leptospirosis may be responsible for losses of young stock in dairy herds, not heretofore attributed to this infection.

Wisconsin, getting set to hang onto its big Chicago-area market by complying with the new Illinois grade A milk law, has just launched a brucellosis control law and program. After Jan. 1, 1955, the Illinois milk market area will accept milk only from herds which are under a Bang's-eradication program. A Wisconsin state committee of 28 farmers, veterinarians, farm editors, farm organization leaders and others set up the program to wipe out brucellosis in that state. Farmers may choose either Plan A, with test and slaughter of reactors within 15 days and a retest later, or Plan B, which permits keeping reactors and requires vaccination of calves with a herd blood test every 18 months. There are indemnity payments for slaughtered reactors.

Veterinary authorities have issued repeated warnings on the use of antiparasitic drugs in the feed of poultry. The natural low of survival and development of resistance have been observed during outbreaks of coccidiosis in broilers plants, in spite of continuous medication with sulfonamides.